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PATENTREMARKS

Upon entry of this amendment, which amends claim 5, claims 1-6 are pending. The Examiner indicated that claims 1-4 have been withdrawn from consideration. Applicants assume that the Examiner has made the restriction requirement mailed May 1, 2001 final after considering Applicants' response filed July 9, 2001. Accordingly, Applicants have cancelled claims 1-4.

Claim 5 has been amended to correct a typographical error. The limitation "coupler clip" has been changed to "copper clip" so that the claim now consistently refers to a copper clip. No new matter has been added.

Claims 5 and 6 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Temple et al. (US Pat. 5103290). The Examiner contends that Temple et al. disclose a chip device/package comprising all the elements of claim 5 with the exception of the copper clip attached to the backside of the bumped die. Temple et al., according to the Examiner, disclose a copper plate/frame (84 in Fig. 11 and 12; Col.8, line 39 - Col.9, line 45) having a top surface soldered to the backside metallization of the die (Col. 8, line 57). The Examiner argues that it would have been obvious to one having ordinary skill in the art to substitute a copper clip for the copper plate/frame of the Temple et al. reference since copper clips are conventional components used in the chip interconnecting packaging art. Applicants respectfully traverse this rejection and request reconsideration of the claims in light of the following remarks.

Applicants respectfully suggest that it would not have been obvious to one of ordinary skill in the art to use the copper clip of the instant invention in place of the copper base plate of the Temple et al. device. The copper base plate of the Temple et al. device, in addition to providing an electrical connection to the drain, is configured to rapidly spread heat generated by the chip during operation. (Temple et al., col. 8, line 42). To this end, the copper base plate is quite thick, 10-20 mils, and is preferably soldered to a heat sink. (Temple et al. col. 8, line 41; col. 9, lines 39-40). Applicants suggest that such a massive heat sinking capability is needed in the Temple et al. device because it is hermetically sealed. The hermetic seal reduces the device's ability to lose

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heat by convection or radiative transfer. In contrast thereto, the instant invention uses a less massive copper clip, yet still attains sufficient heat transfer. It is submitted that this is not an obvious result.

MPEP §2143.03 states, "To establish *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art." Even if *arguendo* the instant invention's copper clip is a substitute for Temple's base plate, Applicants submit that nowhere does Temple et al. disclose, or even suggest "a copper clip attached to a backside of the bumped die such that the copper clip contacts drain regions of the bumped die and a lead rail," as is clearly recited in claim 5. In arguing that Temple et al. disclose a lead rail, the Examiner points to 82 in Fig. 11/12 and Col. 8, line 44. In contrast to the lead rail of the instant invention, these portions of the Temple et al. reference refer to the copper base plate. If Temple et al. had intended to incorporate a lead rail with the copper base plate, it is suggested that they would have described features such as 96 and 98 in Figure 12. These are terminal extensions that are connected to the foil terminals and serve a purpose similar to the leadframe source and gate connections of the instant invention. The Temple et al. reference does not incorporate terminal extensions into the copper base plate (drain connection) while it does on the source and gate connections. In contrast thereto, the instant invention provides leads on all connections, the drain leads being provided on the lead rail and connected to the drain via the copper clip.

Moreover, Applicants point out that the instant invention's provision of the lead rail as a separate element from the copper clip facilitates the streamlined manufacturing process described in the specification. In contrast thereto, the process which produces the device of the Temple et al. reference has sacrificed ease of manufacturing for hermetically sealing the die, which is not a concern of the instant invention.

Applicants respectfully submit that since the Temple et al. reference does not disclose, or even suggest a copper clip connected to the chip backside and a lead rail

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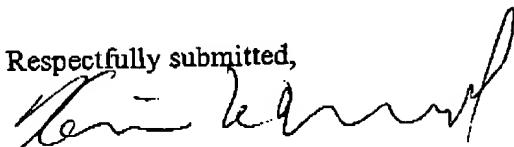
as a separate component, claim 5 is allowable. Since claim 6 depends directly on claim 5, claim 6 is allowable for at least the reasons claim 5 is allowable.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

- 1 1. A method of making a chip device, the method comprising:
2 providing a bumped die including a plurality of solder bumps thereon;
3 providing a leadframe including source and gate connections;
4 placing the bumped die on the leadframe such that the solder bumps
5 contact the source and gate connections;
6 providing a copper clip;
7 attaching the copper clip to a backside of the bumped die with solder paste
8 such that the copper clip contacts drain regions of the bumped die and a lead rail; and
9 reflowing the solder paste and solder bumps.
- 1 2. A method in accordance with claim 1 wherein the solder paste is
2 placed on the backside of the bumped die prior to attaching the copper clip.
- 1 3. A method in accordance with claim 1 wherein the solder paste is
2 placed on the copper clip prior to attaching the copper clip.
- 1 4. A method in accordance with claim 1 wherein the solder bumps are
2 reflowed prior to attaching the copper clip.
- 1 5. A chip device comprising:
2 a leadframe including source and gate connections;
3 a bumped die including solder bumps on a top side, the bumped die being
4 attached to the leadframe such that the solder bumps contact the source and gate
5 connections; and
6 a copper clip attached to a backside of the bumped die such that the
7 copper clip contacts drain regions of the bumped die and a lead rail.

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6. A chip device in accordance with claim 5 wherein the copper clip is attached to the bumped die with solder paste.

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